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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte SUPRATIK GUHA, HENDRIK F. HAMANN
JAMES A. LACEY, MAURICE MCGLASHAN
MARTIN P. O'BOYLE, and ROBERT J. VON GUTFELD,

Appeal 2010-002950¹
Application 10/699,399
Technology Center 2800

Before HOWARD B. BLANKENSHIP, JEAN R. HOMERE, and
CARL W. WHITEHEAD Jr., *Administrative Patent Judges*.

HOMERE, *Administrative Patent Judge*.

DECISION ON APPEAL

¹ The real party in interest is International Business Machines, Corp. (App. Br. 2.)

I. STATEMENT OF THE CASE

Appellants appeal under 35 U.S.C. § 134(a) from the Examiner's final rejection of claims 3-7, 9, 10, 15-19, 21, 22, 29 and 30. Claims 1, 2, 8, 13, 14, 20, 24-28, 31 and 32 have been canceled. Claims 11, 12, and 23 have been withdrawn. (App. Br. 2.) We have jurisdiction under 35 U.S.C. § 6(b).

We affirm.

Appellants' Invention

Appellants invented a method and system for measuring thermal distribution of a chip during operation. As depicted in Figure 8 below, the top side of the chip (101) is coupled to a semi-transparent fluid layer (806) of a duct (805) so as to cool the chip. Above the fluid layer is abutted a semi-transparent duct wall (804) made of polished silicon, quartz, sapphire, glass or diamond (8), having located above it an IR camera (802) for measuring infrared radiation emitted by the chip to thereby calculate thermal distribution of heat thereon. The fluid layer and the duct wall are partially transparent to photons with wavelengths above 3.6 microns to thereby permit the photon detector (IR camera) to see through the duct wall, the fluid layer to the back surface of the chip. (Fig. 8, Spec. ¶¶ [0053-0056].)

Fig. 8 is depicted below:

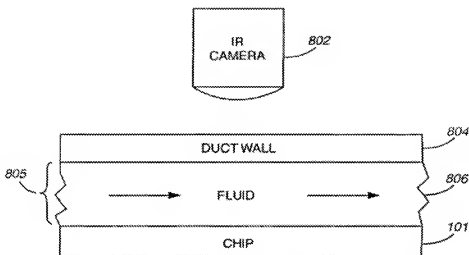


FIG. 8

FIG. 8 is a cross sectional diagram depicting an embodiment of the present invention.

Illustrative Claim

Independent claim 7 further illustrates the invention. It reads as follows:

7. A system for measuring thermal distributions of an electronic device during operation, comprising:

a duct adapted to be coupled with an electronic device, wherein the electronic device forms one side of the duct;

a coolant flowing through the duct so as to cool the electronic device; and

a photon detector located adjacent to the duct for detecting photons emitted from the electronic device, wherein the duct and the coolant are at least partially transparent to photons with wavelengths above 3.6 microns and the duct is

made of at least one of polished silicon, quartz, sapphire, glass, and diamond.

Prior Art Relied Upon

| | | |
|----------|-----------------|---------------|
| Davidson | US 6,104,141 | Oct. 31, 2000 |
| Paniccia | US 6,251,706 B1 | Jun. 26, 2001 |

Rejections on Appeal

The Examiner rejects claims the claims on appeal as follows:

1. Claims 3, 4, 7, 9, 10, 15, 16, 19, 21, 22, and 30 stand rejected under 35 U.S.C. § 103 (a) as being unpatentable over the combination of Davidson and Paniccia.
2. Claims 5, 6, 17, and 18 stand rejected under 35 U.S.C. § 103 (a) as being unpatentable over the combination of Davidson, Paniccia, and Yamada.

ANALYSIS

We consider Appellants' arguments *seriatim* as they are presented in the principal Brief, pages 8-12.

Representative Claim 7

Dispositive Issue: Have Appellants shown that the Examiner erred in finding that the combination of Davidson and Paniccia teaches or suggests a *duct partially transparent to photons with wavelengths above 3.6 microns and the duct is made of polished silicon, quartz, sapphire, glass or diamond*, as recited in independent claim 7?

Appellants argue that the proposed combination of the cited references does not teach or suggest the disputed limitations emphasized above. In particular, Appellants argue that Davidson is directed to a device for sensing voltages of signals on a die by measuring the intensity of near infrared radiation emitted from the circuit, whereas the claimed invention is directed to a device for measuring thermal distribution on a chip by sensing infrared radiation emitted therefrom. (App. Br. 8-9, Reply Br. 4-6.)

According to Appellants, Davidson's near infrared radiation has a defined range of wavelength between 0.7 and 2.5 microns, and the fused quartz and BK-7 materials are inoperable for thermal imaging above 4 microns, whereas the claimed limitations require that the duct be partially transparent to IR radiation with wavelengths above 3.6, and made of polished silicon, quartz, sapphire or glass or diamond. (App. Br. 9-11, Reply Br. 9.) Further, Appellants argue that Paniccia does not teach that the duct contains a cooling fluid flowing therein. (App. Br. 9, Reply Br. 7.)

Additionally, Appellants argue that there is no teaching, suggestion or motivation to combine Davidson's near IR radiation system with Paniccia's IR radiation system. According to Appellants, substituting Paniccia's IR frequency range window for Davison's near IR frequency range window would render Paniccia's system inoperable for its intended purpose. (App. Br. at 10-11, Reply Br. 8-11.)

In response, the Examiner finds that Appellants have mounted an individual attack against the references in lieu of considering the combination thereof. (Ans. 11.) Further, the Examiner finds that the

proposed substitution is to replace Davison's window material with Paniccia's, and not the other way around as argued by Appellants. (*Id.*) Additionally, the Examiner finds that Davidson's disclosure of window materials being transparent to radiation having wavelength of about 1 micron or more overlaps with Appellants' claimed range. (*Id.* at 12.)

Based upon our review of the record, we agree with and adopt the Examiner's underlying factual findings and ultimate legal conclusion of obviousness regarding claim 7. First we agree with the Examiner that Davidson's disclosure of a window being made of materials (fused quartz or BK-7 glass) substantially transparent to near infrared radiation having *wavelengths about 1 micron or more* (col. 2, ll. 58-60) teaches or suggests that the window is at least made of quartz/glass, and it is at least semi-transparent to wavelengths ranging from about one to at least 4 microns, as confirmed by the declaration submitted by Dr. Emmanuel Tutue on behalf of Appellants. (Decl. page 2, para. 9.) Because the disclosed wavelength threshold "4" overlaps with the claimed range of 3.6 or higher for transparency to photons, we find that the use of a quartz/glass window as taught by Davidson teaches a duct partially transparent to photons with a wavelength above 3.6. Consequently, we find that Davidson alone teaches the disputed limitations.

Alternatively, we also agree with the Examiner that replacing the material of Davidson's window with Paniccia's window material (diamond, sapphire, silicon, germanium, or gallium arsenide) which is transparent to infrared radiation and an excellent means for pulling out heat from the back

of silicon devices (col. 21-22, 51-65) would further reinforce Davidson's cooling apparatus. Consequently, Appellants' argument that Davidson's would render Paniccia's system inoperable for its intended purpose is misplaced and not persuasive.

In considering the general form of Appellants' arguments in the principal Brief, Appellants' arguments appear to have attacked the individual teachings of Davidson and Paniccia separately, as opposed to the combined disclosures proffered by the Examiner. We note that one cannot show nonobviousness by attacking the references individually where the rejections are based on *combinations* of references. *In re Merck & Co.*, 800 F.2d 1091, 1097 (Fed. Cir. 1986). Here, the respective references relied on by the Examiner must be read, not in isolation, but for what the combination teaches or suggests when considered as a whole. We find nonetheless that the cumulative weight and the totality of the evidence on this record seem to favor the Examiner's position that the combined disclosures of Davidson and Paniccia would have taught or suggested the disputed limitations.

Rationale to Combine

We are not persuaded by Appellants' argument that there is insufficient rationale for the proffered combination. (App. Br. 8-10, Reply Br. 2-3.) The U.S. Supreme Court has held that "[t]he combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results." *KSR Int'l Co. v. Teleflex, Inc.*, 550 U.S. 398, 416 (2007). The Court further instructs that:

[o]ften it will be necessary for a court to look to interrelated teachings of multiple patents; . . . and the background knowledge possessed by a person having ordinary skill in the art, all in order to determine whether there was an apparent reason for combining the known elements in a the fashion claimed by the patent at issue.

Id. at 418. Additionally, the Court instructs that:

‘rejections on obviousness grounds cannot be sustained by mere conclusory statements. Instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness’... however, the analysis need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ.

Id. (citation omitted).

Upon reviewing the record before us, we find the Examiner’s suggestion for the proposed modification in the prior art suffices as an articulated reason to establish the *prima facie* case of obviousness. In summary, we agree with the Examiner that the ordinarily skilled artisan, being a creative individual would have would have been able to fit the teachings of the cited patents together like pieces of a puzzle to predictably result in a device that lowers the thermal dissipation in an integrated circuit.

Further, as prescribed by the controlling case law, while it is often necessary for an Examiner to identify a reason for combining the familiar elements obtained from the prior art in establishing a *prima facie* case of obviousness, the identification of such a reason is not a *sine qua non* requirement. So long as the Examiner provides an articulated reasoning with some kind of a rational underpinning to substantiate the obviousness

rejection, such a conclusion is proper. In this case, the Examiner provided more than just a mere conclusory statement.

The Examiner noted that at the time of the claimed invention, an ordinarily skilled artisan would have been motivated to combine the cited disclosures of Davidson and Paniccia to provide a window that is partially transparent to photons with wavelengths above 3.6 microns. (Ans. 5.) In our view, such a statement suffices as an articulated reason with a rational underpinning to support the cited combination. As noted above, the case law allows the Examiner to look to the state of the prior art, including the knowledge of the ordinarily skilled artisan to arrive at such a reason for combining the known elements of the prior art. Consequently, the Examiner's reliance upon the cited references in order to arrive at an articulated reason with a rational underpinning to support the proffered combination is proper.

Therefore, we find unpersuasive Appellants' argument that Davidson and Paniccia are not properly combined to teach or suggest the disputed limitations. It follows that Appellants have not shown error in the Examiner's conclusion that the proffered combination renders claim 7 unpatentable.

Claims 3-6, 9, 10, 15-19, 21, 22, 29 and 30 (not argued separately) fall therewith. *See* 37 C.F.R. § 41.37(c)(1)(vii).

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DECISION

We affirm the Examiner's rejection of claims 3-7, 9, 10, 15-19, 21, 22, 29 and 30.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED

Vsh